REMARKS

Status of the Claims

Claims 1-8, 22-39, 41, 42, and new claims 48-63 are pending, with claims 1, 22, 30, 38, 41, 48, and 56 being independent. Claims 9 and 40 have been canceled without prejudice to or disclaimer of the subject matter contained therein. Claims 10-21 and 43-47 have also been canceled without prejudice to or disclaimer thereof the subject matter contained therein as directed to non-elected subject matter pursuant to the restriction requirement. Applicants have no intention of abandoning any non-elected subject matter and expressly reserve the right to file one or more continuation and/or divisional applications directed to the non-elected subject matter.

Claims 1, 2, 22, 30, 36, 38, and 41 have been amended and new claims 48-63 have been added to even more clearly recite and distinctly recite particularly preferred embodiments of the present invention. Support for the amendments and new claims may be found throughout the specification, including, for example, at page 7, lines 23-39 and lines 30-33; page 9, lines 25-27; page 13, lines 3-4 and lines 11-18; and page 14, lines 9-12 and lines 23-25. Therefore, no new matter has been added.

In the specification Table V on page 25 has been amended to clarify that in the first column, the amount of PNPP added was 1.0 g to provide a solution comprising 100 mg/mL PNPP.

Applicants initially would like to thank the Examiner for conducting an interview with Applicant's representatives on May 3, 2005. During the interview Applicant's representatives presented proposed amendments and arguments distinguishing the Siegenthaler article, which the Examiner indicated appeared to obviate the rejections of record.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

Restriction

Applicants confirm election of Group I, namely claims 1-9 and 22-42, with traverse. Applicants note that in the present response claims 10-21 and 43-47 have been canceled as directed to non-elected subject matter pursuant to the restriction requirement.

Specification

The specification has been objected because allegedly the amount of PNPP and AMPD added in Table V are not clear.

As noted above, Table V on page 25 of the specification has been amended to clarify that in the first column, the amount of PNPP added was 1.0 g to provide a solution comprising 100 mg/mL PNPP.

Applicants point out that, for example, the solution as set forth in the first column of Table V was formed by mixing 0.5 g 2-amino-2-methyl-1,3-propanediol (AMPD), 1.0 g PNPP, and 10 mL H_2O to form a solution to which 1 g charcoal was added. As 1.0 g PNPP is added to 10 mL H_2O, a solution comprising 100 mg/mL PNPP is provided, as recited in Table V. Applicants note that 2-amino-2-methyl-1,3-propanediol (AMPD) is a white powder with a melting point of 111°C (see the attached Material Data Safety Sheet (MSDS)). Accordingly, to form an AMPD buffer, *solid* AMPD is added to water. Therefore, it is appropriate to report the amount of AMPD added in grams.

Applicants respectfully assert that with the amendment to clarify that in the first column, the amount of PNPP added was 1.0 g to provide a solution comprising 100 mg/mL PNPP, the units reported in Table V are appropriate and clear to one of skill in the art. Accordingly, Applicants respectfully request that the objection to the specification be withdrawn.

Claim Rejections under 35 U.S.C. § 112, second paragraph

Claim 2 has been rejected under 35 U.S.C. § 112 for allegedly insufficient antecedent basis for the phrase "the phenyl phosphate". Without conceding the propriety of the rejection and merely in order to expedite prosecution, Claim 2 has been amended to recite "the solubilized phenyl phosphate." Accordingly, Applicants respectfully submit that the rejection has been obviated and request withdrawal thereof.

Claims 36 and 37 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. It is allegedly unclear if the enzyme included in the reagent kit, as recited in claim 36, is packaged separately in the kit or is included in the substrate composition.

Applicants note that as disclosed in the specification, the substrate composition is for measuring enzyme activity. Accordingly, the enzyme would be packaged separately in the kit to prevent hydrolysis of the solubilized phenyl phosphate by the enzyme. In this regard, without conceding the propriety of this rejection and merely in order to expedite prosecution, claim 36 has been amended to clarify that the enzyme is packaged separately. Accordingly, Applicants respectfully submit that the rejection has been obviated and request withdrawal thereof.

Claim Rejections under 35 U.S.C. § 102(b)

Claims 1, 2, 8, and 9 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Siegenthaler. Without conceding the propriety of the rejection, Applicants have amended the claims as presented herein in order to expedite prosecution and to pursue an early allowance. In view of the amended claims, Applicants respectfully disagree with the rejection; therefore, this rejection is respectfully traversed.

Siegenthaler relates to a method by which a solution of p-nitrophenyl phosphate may be purified if the solution has turned yellow. (page 2, 3rd paragraph). Siegenthaler discloses that if the solution turns yellow, the solution must be purified, and as disclosed by Siegenthaler, purification can be performed by placing around 2 cm high of activated charcoal in a filter tube and filtering the solution of p-nitrophenyl phosphate through the charcoal with the use of a vacuum. (page 2, 4th paragraph). Siegenthaler further discloses that the purified, filtered product remains usable for fourteen days when stored in brown bottles and cool. (page 3, 1st paragraph).

In contrast, presently pending claim 1 recites a method for stabilizing a ***colorless*** solubilized phenyl phosphate comprising contacting the solubilized phenyl phosphate with a stabilizing amount of charcoal and ***retaining the charcoal*** in contact with the solubilized phenyl phosphate to provide a stabilized, solubilized phenyl phosphate having a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min. As such, the presently claimed method is directed to stabilizing a ***colorless*** solubilized phenyl phosphate, i.e., a solubilized phenyl phosphate which has ***not*** been previously colored due to non-enzymatic hydrolysis.

To anticipate a claimed invention under §102, a reference must teach each and every element of the claimed invention. *See Lindeman Machinenfabrik GmbH v. American Hoist and*

Derrick Company, 221 USPQ 481, 485 (Fed. Cir. 1984). It is respectfully submitted that in no way does Siegenthaler disclose or suggest the presently claimed method for stabilizing a colorless solubilized phenyl phosphate. As described above, Siegenthaler discloses a method by which a solution of p-nitrophenyl phosphate may be purified ***if the solution has turned yellow*** comprising ***filtering*** the yellowed solution through activated charcoal.

Accordingly, in no way does Siegenthaler disclose or suggest a method for stabilizing a ***colorless*** solubilized phenyl phosphate comprising contacting the solubilized phenyl phosphate with a stabilizing amount of charcoal and ***retaining the charcoal*** in contact with the solubilized phenyl phosphate to provide a stabilized, solubilized phenyl phosphate having a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min.

As Siegenthaler does not disclose each and every element of the claims, it cannot anticipate the presently claimed invention of claim 1 or claims dependent thereon. Accordingly, withdrawal of the rejection under 35 U.S.C. § 102(b) is respectfully requested.

Claim Rejections under 35 U.S.C. § 103(a)

Claims 4-7, 22-25, 30-31, 32-37, and 41-42 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Siegenthaler in view of Modrovich (US Patent 4,132,598) and in light of HowStuffWorks.com and Sigma (Product Catalog, 2004). Claims 3, 26-29, and 38-40 also stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Siegenthaler in view of Modrovich (US Patent 4,132,598) and in light of HowStuffWorks.com and Sigma (Product Catalog, 2004). Without conceding the propriety of the rejections, Applicants have amended the claims as presented herein in order to expedite prosecution and to pursue an early allowance. In view of the amended claims, Applicants respectfully disagree with the rejections; therefore, these rejections are respectfully traversed.

As described above, Siegenthaler relates to a method by which a solution of p-nitrophenyl phosphate may be purified if the solution has turned yellow comprising filtering the yellowed solution through activated charcoal.

Modrovich relates to a stabilized liquid phosphate containing diagnostic composition. Modrovich discloses that the composition includes a buffer composition containing a magnesium ion for activation of the enzyme. Modrovich discloses that stabilizers are employed that will

prevent hydrolysis of the phosphate from the organic substrate, and effective stabilizers include phenol and phenolic compounds and imidazole and nitro aliphatic compounds having from one through six carbon atoms. (Abstract).

HowStuffWorks.com merely discloses that activated charcoal is charcoal that has been treated with oxygen to open up millions of tiny pores between the carbon atoms and may be used to remove certain impurities.

Sigma (Product Catalog, 2004), as cited, provides properties of 2-amino-2-methyl-1,3-propanediol and BIS-TRIS and information regarding their commercial availability.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP § 2143.

As discussed during the interview and as disclosed in the Background of Invention section of present specification, although enzyme linked immunosorbant assays (ELISAs) using *p*-nitrophenylphosphate (PNPP) – alkaline phosphatase reaction are extremely useful and powerful tools, PNPP is extremely unstable and will hydrolyze to the colored phenoxide in solution, even in the absence of enzyme. In fact, when left at room temperature in a lighted room in a clear vessel, PNPP will hydrolyze within only a few hours, and even when stored at low temperatures in an amber vessel, PNPP will still hydrolyze over time. Accordingly, the instability of PNPP in solution renders it commercially difficult for research uses and there has been a great deal of research into methods, including quite complex methods, for stabilizing phenyl phosphates.

Also as discussed during the interview and as disclosed in the Background of Invention section of present specification, the present commercial state of the art used for stabilizing phenyl phosphates, such as PNPP, is to provide the compounds in a solid matrix, either by freeze drying, dry blending such as used for tableting dried powders in the pharmaceutical, diagnostic and related industries, or chemical immobilization by locking the chemical structure of the substrate in a solid matrix. However, providing PNPP in a solid matrix is expensive. In

addition, since the end-user must reconstitute the phenyl phosphate, quality control problems may be introduced into the final product and when reconstituted, the phenyl phosphate solution still hydrolyzes and cannot be stored for extended periods of time.

Although methods have been developed in an attempt to stabilize PNPP, none of those methods have proven to be commercially viable and permit ***long term storage*** of a phenyl phosphate in solution either at reduced temperatures, such as 4°C, or elevated temperatures, which may be experienced while shipping phenyl phosphate solutions or storing phenyl phosphate solutions on bench-tops in the laboratory. The presently claimed invention addresses the need for improving the storage stability of PNPP in solution.

According to the present invention, it has been quite surprisingly discovered that solutions of phenyl phosphate may be stabilized, thus providing stabilized solubilized phenyl phosphate, using charcoal. The stabilized solubilized phenyl phosphate, according to the present invention, has a surprisingly lengthy shelf-life, even when stored in light at room temperature (preferably for 30 days or more in light at room temperature).

Accordingly, the presently claimed invention provides methods for stabilizing a solubilized phenyl phosphate; stabilized, solubilized phenyl phosphate; ready-to-use enzyme substrate compositions; and methods of preparing an aqueous liquid substrate system used in phosphatase enzyme determination.

As recited in independent claim 1, the presently claimed invention provides a method for stabilizing a ***colorless*** solubilized phenyl phosphate comprising contacting the solubilized phenyl phosphate with a stabilizing amount of charcoal and ***retaining the charcoal*** in contact with the solubilized phenyl phosphate to provide a stabilized, solubilized phenyl phosphate having a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min. As such, the presently claimed method of claim 1 and claims dependent thereon is directed to stabilizing a ***colorless*** solubilized phenyl phosphate, i.e., a solubilized phenyl phosphate which has ***not*** been previously colored due to non-enzymatic hydrolysis.

Applicants respectfully submit that the presently claimed method for stabilizing a colorless solubilized phenyl phosphate is significantly different than the method as disclosed in Siegenthaler. As discussed above, in no way does Siegenthaler disclose or suggest a method for

stabilizing a ***colorless*** solubilized phenyl phosphate comprising contacting the solubilized phenyl phosphate with a stabilizing amount of charcoal and ***retaining the charcoal*** in contact with the solubilized phenyl phosphate to provide a stabilized, solubilized phenyl phosphate having a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min.

Moreover, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed method for stabilizing a colorless solubilized phenyl phosphate as recited in claim 1 or claims dependent thereon.

As recited in independent claim 22, the presently claimed invention provides a stabilized, solubilized phenyl phosphate comprising a solution, comprising phenyl phosphate in a buffer, and a stabilizing amount of charcoal. The solution comprising phenyl phosphate in a buffer has not previously been colored due to non-enzymatic hydrolysis, and the stabilized, solubilized phenyl phosphate has a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min.

Applicants respectfully submit that the presently claimed stabilized, solubilized phenyl phosphate is significantly different than the purified p-nitrophenyl phosphate solution disclosed in Siegenthaler. In no way does Siegenthaler disclose or suggest a stabilized, solubilized phenyl phosphate comprising a solution comprising phenyl phosphate in a buffer, ***wherein the solution has not previously been colored due to non-enzymatic hydrolysis,*** and a stabilizing amount of charcoal, wherein the stabilized, solubilized phenyl phosphate has a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min.

Moreover, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed stabilized, solubilized phenyl phosphate as recited in claim 22 or claims dependent thereon.

As recited in independent claim 30, the presently claimed invention provides a ready-to-use enzyme substrate composition comprising ***colorless solubilized phenyl phosphate***, a buffer, and ***charcoal***. As discussed above, it has been quite surprisingly discovered that solutions of phenyl phosphate may be stabilized so that they have surprisingly lengthy shelf-life, even when stored in light at room temperature (preferably for 30 days or more in light at room temperature), using charcoal.

Applicants respectfully submit that the presently claimed ready-to-use enzyme substrate composition is significantly different than the purified p-nitrophenyl phosphate solution disclosed in Siegenthaler. In no way does Siegenthaler disclose or suggest a ready-to-use enzyme substrate composition comprising ***colorless solubilized phenyl phosphate, a buffer, and charcoal***.

Moreover, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed a ready-to-use enzyme substrate composition as recited in claim 30 or claims dependent thereon.

As recited in independent claim 38, the presently claimed invention provides a method of preparing an aqueous liquid substrate system used in phosphatase enzyme determination comprising: (a) solubilizing a phenyl phosphate in an aqueous buffered solvent to provide a phenyl phosphate solution; (b) adding a magnesium compound to the ***colorless*** phenyl phosphate solution; (c) contacting the ***colorless phenyl phosphate solution*** with a stabilizing amount of charcoal; (d) ***retaining the magnesium compound and charcoal*** in the colorless phenyl phosphate solution; and (e) sealing the mixture. As such, the presently claimed method of claim 38 and claims dependent thereon relates to ***colorless*** phenyl phosphate solutions, i.e., phenyl phosphate solutions which have ***not*** been previously colored due to non-enzymatic hydrolysis.

Applicants respectfully submit that the presently claimed method of preparing an aqueous liquid substrate system used in phosphatase enzyme determination is significantly different than the method as disclosed in Siegenthaler. Applicants respectfully submit that in no way does Siegenthaler disclose or suggest a method of preparing an aqueous liquid substrate system used

in phosphatase enzyme determination comprising: (a) solubilizing a phenyl phosphate in an aqueous buffered solvent to provide a phenyl phosphate solution; (b) adding a magnesium compound to the ***colorless*** phenyl phosphate solution; (c) contacting the ***colorless phenyl phosphate solution*** with a stabilizing amount of charcoal; (d) ***retaining the magnesium compound and charcoal*** in the colorless phenyl phosphate solution; and (e) sealing the mixture.

Applicants further respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed method of preparing an aqueous liquid substrate system used in phosphatase enzyme determination. As described above, Modrovich discloses a stabilized liquid phosphate containing diagnostic composition including a buffer composition containing a magnesium ion for activation of the enzyme and stabilizers. Modrovich discloses that effective stabilizers include phenol and phenolic compounds and imidazole and nitro aliphatic compounds having from one through six carbon atoms. Also as described above, HowStuffWorks.com merely discloses that activated charcoal is charcoal that has been treated with oxygen to open millions of tiny pores, and Sigma merely discloses properties of AMPD and BIS-TRIS.

Accordingly, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest solubilizing a phenyl phosphate in an aqueous buffered solvent to provide a phenyl phosphate solution; adding a magnesium compound to the ***colorless*** phenyl phosphate solution; contacting the ***colorless phenyl phosphate*** solution with a stabilizing amount of charcoal; ***retaining the magnesium compound and charcoal*** in the colorless phenyl phosphate solution; and sealing the mixture.

As recited in independent claim 41, the presently claimed invention provides a vessel for containing a ***colorless*** solubilized phenyl phosphate in a basic buffer, wherein the vessel comprises ***charcoal on the surface of the vessel exposed to the solubilized phenyl phosphate***. As discussed above, it has been quite surprisingly discovered that solutions of phenyl phosphate

may be stabilized so that they have surprisingly lengthy shelf-life, even when stored in light at room temperature (preferably for 30 days or more in light at room temperature), using charcoal.

Accordingly, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed vessel for containing a ***colorless*** solubilized phenyl phosphate in a basic buffer. Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest a vessel for containing a ***colorless*** solubilized phenyl phosphate in a basic buffer, wherein the vessel comprises ***charcoal on the surface of the vessel exposed to the solubilized phenyl phosphate***.

As recited in new independent claim 48, the presently claimed invention provides a method for stabilizing a ***solubilized phenyl phosphate which has been colored due to non-enzymatic hydrolysis*** comprising contacting the solubilized phenyl phosphate with a stabilizing amount of charcoal and ***retaining the charcoal*** in contact with the solubilized phenyl phosphate to provide a stabilized, solubilized phenyl phosphate having a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min for ***30 days or more in light at room temperature***. As discussed above, it has been quite surprisingly discovered that solutions of phenyl phosphate may be stabilized, thus providing stabilized solubilized phenyl phosphate, using charcoal, and the stabilized solubilized phenyl phosphate, according to the present invention, has a ***surprisingly lengthy shelf-life, even when stored in light at room temperature*** (for 30 days or more in light at room temperature).

In contrast, Siegenthaler discloses a method by which a solution of p-nitrophenyl phosphate may be purified if the solution has turned yellow comprising filtering the yellowed solution through activated charcoal. Siegenthaler further discloses that the purified, filtered product remains usable for fourteen days when stored in brown bottles and cool.

Accordingly, Applicants respectfully submit that the presently claimed method for stabilizing a solubilized phenyl phosphate which has been colored due to non-enzymatic

hydrolysis is significantly different than the method as disclosed in Siegenthaler. In no way does Siegenthaler disclose or suggest a method for stabilizing a ***solubilized phenyl phosphate which has been colored due to non-enzymatic hydrolysis*** comprising contacting the solubilized phenyl phosphate with a stabilizing amount of charcoal and ***retaining the charcoal*** in contact with the solubilized phenyl phosphate to provide a stabilized, solubilized phenyl phosphate ***having a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min for 30 days or more in light at room temperature***.

Moreover, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed method for stabilizing a solubilized phenyl phosphate which has been colored due to non-enzymatic hydrolysis as recited in claim 48 or claims dependent thereon.

As recited in new independent claim 56, the presently claimed invention provides a stabilized, solubilized phenyl phosphate comprising a solution comprising phenyl phosphate in a buffer, ***wherein the solution has previously been colored due to non-enzymatic hydrolysis***, and a stabilizing amount of charcoal, wherein the stabilized, solubilized phenyl phosphate ***has a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min for 30 days or more in light at room temperature***. As discussed above, it has been quite surprisingly discovered that solutions of phenyl phosphate may be stabilized, thus providing stabilized solubilized phenyl phosphate, using charcoal, and the stabilized solubilized phenyl phosphate, according to the present invention, has a ***surprisingly lengthy shelf-life, even when stored in light at room temperature*** (for 30 days or more in light at room temperature).

In contrast, Siegenthaler discloses a method by which a solution of p-nitrophenyl phosphate may be purified if the solution has turned yellow comprising filtering the yellowed solution through activated charcoal. Siegenthaler further discloses that the purified, filtered product remains usable for fourteen days when stored in brown bottles and cool.

Accordingly, Applicants respectfully submit that the presently claimed stabilized, solubilized phenyl phosphate is significantly different than the purified p-nitrophenyl phosphate

solution disclosed in Siegenthaler. In no way does Siegenthaler disclose or suggest a stabilized, solubilized phenyl phosphate comprising a buffer, ***a phenyl phosphate that has previously been colored due to non-enzymatic hydrolysis***, and a stabilizing amount of charcoal, wherein the stabilized, solubilized phenyl phosphate ***has a background absorbance of less than about 0.1 at 405 nm and an activity of about 0.2 OD/min for 30 days or more in light at room temperature***.

Moreover, Applicants respectfully submit that even if there were some suggestion or motivation to combine Siegenthaler, Modrovich, HowStuffWorks.com and Sigma and a reasonable expectation of success in doing so, even when combined the cited art does not disclose or suggest all the limitations of the presently claimed stabilized, solubilized phenyl phosphate as recited in claim 56 or claims dependent thereon.

Therefore, for at least the above described reasons, withdrawal of the rejections under 35 U.S.C. § 103(a) are respectfully requested.

Conclusion

Without conceding the propriety of the rejections, the claims have been amended, as provided above, to even more clearly recite and distinctly claim Applicants' invention and to pursue an early allowance. For the reasons noted above, the art of record does not disclose or suggest the inventive concept of the present invention as defined by the claims.

In view of the foregoing amendments and remarks, reconsideration of the claims and allowance of the subject application is earnestly solicited. In the event that there are any questions relating to this application, it would be appreciated if the Examiner would telephone the undersigned attorney concerning such questions so that prosecution of this application may be expedited.

In the event any further fees are due to maintain pendency of this application, the Examiner is authorized to charge such fees to Deposit Account No. 02-4800.

Respectfully submitted,

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Safety (MSDS) data for 2-amino-2-methyl-1,3-propanediol

General

Synonyms:
Molecular formula: $HOCH_2C(NH_2)(CH_3)CH_2OH$
CAS No: 115-69-5
EC No:

Physical data

Appearance: white powder
Melting point: 111 C
Boiling point: 151 C
Vapour density:
Vapour pressure:
Density (g cm^{-3}):
Flash point:
Explosion limits:
Autoignition temperature:
Water solubility: appreciable

Stability

Stable. Combustible. May be moisture-sensitive.

Toxicology

May cause skin irritation.

Toxicity data
(The meaning of any abbreviations which appear in this section is given here.)
ORL-MUS LD50 3500 mg kg^{-1}

Risk phrases
(The meaning of any risk phrases which appear in this section is given here.)

Transport information

Personal protection

Safety glasses.

Safety phrases
(The meaning of any safety phrases which appear in this section is given here.)

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